

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
RESEARCH AND TECHNOLOGY RESUME

TITLE

Infrared Observations of Periodic Comets

PERFORMING ORGANIZATION

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INVESTIGATOR'S NAME

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DESCRIPTION (a. Brief statement on strategy of investigation; b. Progress and accomplishments of prior year; c. What will be accomplished this year, as well as how and why; and d. Summary bibliography)

a. Selected comets are observed in the infrared with the NASA IRTF and other telescopes as appropriate. The scientific objectives are to characterize the thermal emission from the dust coma, derive dust production rates, detect silicate features near 10 and 20 microns, derive average albedo of the grains, and detect changes in grain size or composition with heliocentric distance as well as differences among comets. Knowledge of the dust environment is essential to S/C design and mission planning for NASA's CRAF mission.

b. FY88 Progress: A report was prepared from Aug. 1987 workshop on Infrared Observations of Comets Halley and Wilson and Properties of the Grains, (NASA SP, in press, M. Hanner, ed.). Comets Wilson, Klemola, Brooks 2, Borrelly, and Bradfield were observed at the IRTF in Sept. 87 and Feb. 88. We detected 10 and 18 micron thermal emission for Wilson at $R = 3.74$ AU. Both 10 micron CVF spectra and 3 micron CGAS spectra were obtained for Borrelly and Bradfield. A paper on Comet Wilson is in preparation.

c. FY89 Plans: Comet P/Tempel 2 will be extensively observed near perihelion at the IRTF. Although this comet is no longer the target for NASA's CRAF mission, we will surely learn a great deal about short period comets from the observing programs at many wavelendths already planned. A review paper on infrared observational techniques for comets will be prepared for the Bamberg Conference. Papers on P/Borrelly and other comets observed in 1987-88 will be prepared.

d. 1). Hanner, M. S., R. L. Newburn, H. Spinrad and G. J. Veeder (1987). Comet Sugano-Saigusa-Fujikawa (1983V): A Small, Puzzling Comet. Astron. J., 94, 1081.

2). Hanner, M. S., P. N. Kupferman, G. Bailey and J. C. Zarnecki (1987). IR Imaging with JPL's Linear Array Camera, in Infrared Astronomy with Arrays (ed. C. G. Wynn-Williams and E. E. Becklin), p. 205.

3). Veeder, G. J., M. S. Hanner, and D. J. Tholen (1987). The Nucleus of Comet P/Arend-Rigaux. Astron. J., 94, 169.

4). Hanner, M. S., A. T. Tokunaga, W. F. Golisch, D. M. Griep and C. D. Kaminski (1987). Infrared Emission from Halley's Dust Coma during March 1986. A & A, 187, 653.

5). Hanner, M. S., ed (1987). Infrared Observations of Comets Halley and Wilson and Properties of the Grains. NASA Conference Publication, in press.

6). Hanner, M. S. and Newburn, R. L. (1987). Infrared Observations of Comet Wilson. Bull. Amer. Astron. Soc. 19, 893.

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1987 RELEVANT PUBLICATIONS

- Hanner, M. S., ed (1987). Infrared Observations of Comets Halley and Wilson and Properties of the Grains. (Workshop, Cornell Univ. Ithaca, NY, August 1987). NASA Conference Publication, in press.
- Hanner, M. S., P. N. Kupferman, G. Bailey and J. C. Zarnecki (1987). IR Imaging with JPL's Linear Array Camera, in Infrared Astronomy with Arrays (ed. C. G. Wynn-Williams and E. E. Becklin), p. 205.
- Hanner, M. S., R. L. Newburn, H. Spinrad and G. J. Veeder (1987). Comet Sugano-Saigusa-Fujikawa (1983V): A Small, Puzzling Comet. *Astron. J.*, 94, 1081.
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- McDonnell, J. A. M. et al., (incl. Hanner) (1987). The Dust Distribution within the Inner Coma of Comet P/Halley 1982i: Encounter by Giotto's Impact Detectors. *Astron. Astrophys.*, 187, 719.
- Veeder, G. J., M. S. Hanner, and D. J. Tholen (1987). The Nucleus of comet P/Arend-Rigaux. *Astron. J.*, 94, 169.